PC Card User's Guide

NOTICE

Contents

Getting Started

In your modem package, you should have received the following items in addition to this manual:

- PC Card modem
- PC Card phone cord
- Communications software on CD or diskette
- Phone cord adapter (certain models only).

To use your modem, you need the following hardware:

- A 133MHz computer with a CD-ROM drive, running Windows® 95, 98, Me, NT 4.0, or 2000, with a PC Card Type II, Type III, or Toshiba 16mm slot, at least 16 MB RAM (32 MB recommended), and a hard drive with at least 5 MB available.

Setting Up Your Modem

Windows 95/98/Me/2000 or Later

We have enhanced Windows' plug-and-play capability and streamlined the installation of your modem by including an InstallShield® software program. For Windows 95/98/Me/2000 (or later) computers, you must run this program before you install your modem.

This InstallShield® program installs driver files and sets up your computer to recognize the new modem. When you restart your computer after installing the modem, your hard drive will already contain the files Windows needs to complete the installation. Continue with the **Installing the Drivers** section below.

Windows NT 4.0

For computers running Windows NT 4.0, we've also streamlined the installation, but the sequence is different. **You must first install your new modem,** then run the InstallShield program. To begin installing your new PC Card with Windows NT 4.0, please go to the **Installing the PC Card** section on page 7.

Installing the Drivers

For Windows 95/98/Me/2000: Put the modem aside and follow the steps below.

For Windows NT 4.0: Turn to page 7 to first install the modem and then return to this section.

1 Your computer should be on and all applications should be closed.

Insert the CD-ROM disc that came with your modem into your CD-ROM drive. The CD should start automatically. If it doesn't:

- Click **My Computer** on your desktop; then double-click the icon for your CD-ROM drive.
- If the installation program doesn't start right away, double-click **setup.exe**.

2 When the installation interface screen appears, click the **Install Modem Drivers** button. The installation program will automatically copy driver files to your hard drive. Do not install any of the other software at this time.

3 ***Windows NT 4.0 only:***

A **Select Components** dialog box will display. Make sure the **Install new modem driver and components** choice is selected. Click **Next**. A **Setup Complete** dialog box will display. Click **Finish**.

4 Shut down your computer and turn the power off.

5 ***For Windows 95/98/Me/2000:*** Follow the instructions for **Installing the PC Card** below.

For Windows NT 4.0: After following the steps on page 7 and installing the drivers according to the instructions above, go to **Verifying the Installation**, page 9.

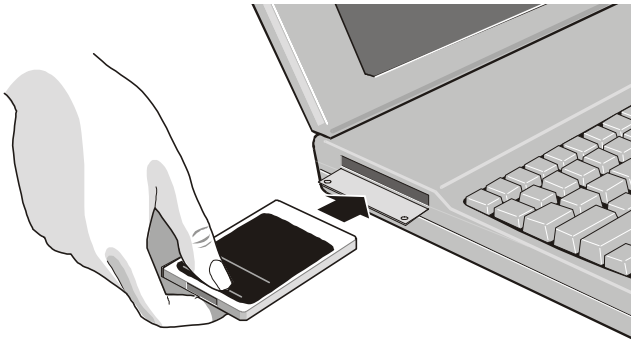
Installing the PC Card

Note To Users of Windows 95/98/Me/2000:
If you have not already run the modem installation program on the CD-ROM disc, please do so now, **before** you install the modem card. See **Installing the Drivers** on page 6.

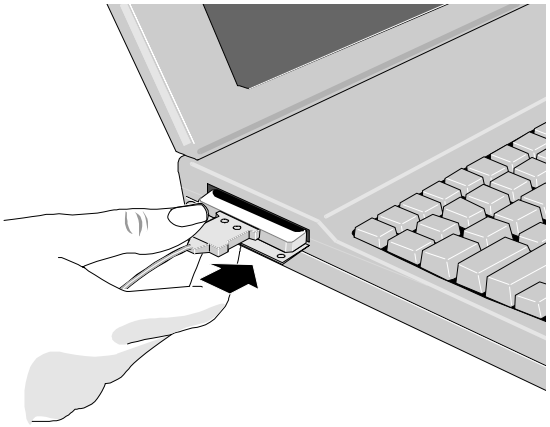
Note to Users of Windows NT:
Before you can use a PC Card in a computer running Windows NT, you must enable PCMCIA. If this is your first PC Card, go to **Control Panel | Devices**, scroll down to the **PCMCIA** entry, and highlight it. Click the **Startup** button and then select either **Boot** or **Automatic**.

1. **Before you start the hardware installation, close all running programs and shut down Windows if you have not already done so.**

2. With the top of the modem card facing up, insert the modem into the PC Card Type II, Type III, or Toshiba 16mm card slot in your computer as shown below. Push the modem *firmly, but gently* until it is seated inside the slot and you cannot push it any further.



3 Connect the phone cable to the modem card as shown. You should feel the connector snap into place. If the cable's connector still does not fit easily into the card, turn the connector over and try again.



4 Plug the other end of the cable into the modular telephone jack (receptacle) on your wall. You may need to use an adapter plug between the cable's jack and your wall jack.

If you want to plug both the modem cable and a telephone cable into one wall jack, you may be able to use a phone line splitter, which is available through electronics supply stores.

5 Turn the computer back on.

Windows NT 4.0 users: Now return to **Installing the Drivers** on page 6.

Note:	Windows has a power management feature that powers down the PC Card completely when it is not in use. This feature may cause problems with some communications software. For advice, see **Appendix A: Disabling Power Management in Windows**.

Verifying the Installation

Windows 95/98/Me/2000 users:

Windows PC Card support must be installed before you can use a PCMCIA-compatible card of any type. If you are unsure if you have this support, click **Start | Settings | Control Panel**. If you see the PC Card (PCMCIA) icon (such as the one shown here) in the Control Panel window, you can proceed. If not, consult your Windows documentation for instructions on installing this software.

Windows NT users:

To check that your system has detected the PC Card, open the **Control Panel** and select **PC Card (PCMCIA)**. This modem should be listed under the **Socket Status** tab. Select **Properties**. Under **Device Status**, "The device is working properly" should be listed along with a COM port number. Click **OK** to exit the **PC Card** dialog box.

Note to Users of Computers Running Windows NT:

1. You must be running Windows NT 4.0 with Service Pack 4 or higher (6 is recommended). If the native PC Card services is not already installed, please see your Windows NT user documentation for PC Card modem installation.

2. Windows NT does not permit hot-swapping of PC Cards.

Changing Your Country Setting

Our World Traveler™ country select software, included on the accompanying CD, provides configuration information so that your modem automatically works with the telephone system in your country.

If you need to change your country setting, follow these steps:

1. Click **Start | Programs**. Select **World Traveler** to launch the application.
2. A dialog box will display. Select the country of your choice from the drop-down list and click **Set**.

That's it! If you have problems with your modem after running the software, make sure that your modem is connected properly and try again.

Installing Your Communications Software

Please refer to your software installation guide for setting up your communications software. You may also want to read **Using Your Modem** for additional fax and data configuration tips.

Then continue with the rest of this section for procedures to test your modem and remove it from your computer.

Testing Your PC Card Modem

After you install and configure your fax and communications software (and your card management software if needed), you can test whether the modem is properly connected.

If you have installed data communications software, start up the software. As part of its startup routine, it may send the command **AT** to the modem and receive the response **OK**. This indicates that your modem is working.

If you do not see an **AT** command and response, change to terminal mode (also known as command, direct, or local mode). Type **AT** and press the **Enter** key. The modem should display the word **OK** on your screen. If you do *not* see this response, make sure that the data software is configured for the same COM port specified in the card management software. Then enter the AT command again. If the modem still does not respond, refer to **Troubleshooting**. When you finish the test, you can exit the software.

If you have installed fax software, you may be given an opportunity to register the software with its publisher. If there is a registration form, follow the steps for registering the software. If you are unable to transmit the registration form, make sure that the fax software is configured for the same COM port specified in the card management software. Then try transmitting the form again. When you finish the test, you can exit the software.

Uninstalling Your PC Card Modem

If you ever want to uninstall your modem, follow these steps:

1. From the desktop, go to **Control Panel | Add/Remove Programs**.
2. Highlight the modem you want to remove, click the **Remove** button, and click **OK**.
3. Under **Control Panel | Modems**, verify that your modem has been removed. If not, highlight it, delete it, and click **OK**.

Using Your Modem

If you have installed the faxing and communications software that came with your modem, you probably do not need to read this section. The software sets itself up automatically and takes care of sending any necessary commands to the modem.

You may, however, want to read this section if you want to learn some general facts about how software works with your modem or if you intend to use your new modem with other software.

This section provides tips for setting up faxing and communications software, sending initialization strings containing **AT** commands to the modem, using a video camera, and accessing the Internet.

Using Fax/Data/Voice Communications Software

Fax and data communications programs are designed to simplify the tasks of sending and receiving faxes and data. You communicate with most programs by making menu selections. The programs then translate your selections into the AT commands needed to communicate with the modem. In addition, your modem supports a full-featured single or multiple mailbox voicemail system. Through your software, you can also set up fax-back (fax-on-demand), and record and playback messages.

When you install your software, you are taken through a series of setup options. With virtually all commercially available software, once you select the name of your modem during installation you can accept all the default settings that the software suggests.

Customizing Modem Settings

The software sends a string of AT command settings to the modem as soon as you start up the software. The string is called an initialization string. The software determines which commands go into the initialization string based on the device you select during installation.

The commands remain in effect throughout the communications session, unless the software sends other commands to override them.

The software uses other AT command strings for other purposes. For example, when you make a call from your modem, the software inserts AT commands in a dial string with the phone number you are calling. You can use the AT command strings that are provided with the software.

It is sometimes necessary, however, to add other AT commands to initialization strings. Some AT commands are suggested in the following sections and in **Troubleshooting**. You can also find a fuller discussion of AT commands on the World Wide Web at **www.modems.com**. Click on **Reference** and then on **AT Command Sets**.

In setting up your software, you may be asked to enter certain information. Most programs have default settings that are correct for use with this modem, and there will be no need to change them. You should, however, check the following items.

Tips for Setting Up Fax Software

- You may be asked to select the "modem type" from a menu. If you don't see this modem listed by name on the menu, select a **56K, V92, V.90,** or **V.34 modem with 14,400 send/receive fax.**
- If your telephone service includes Call Waiting that you can temporarily suspend by dialing a special code, include that code in the dial prefix option, followed by a comma, in the software. If your software does not have a dial prefix option, you need to insert the code for each phone number in the dialing directory. If you need to dial a special code number, such as **9**, to get an outside line, put the number (followed by a comma) before the phone number.

Tips for Setting Up Data Communications Software

- You may be asked to select the "modem type" from a menu. If you don't see this modem listed by name on the menu, select a name that includes **K56flex, V.90, V.92,** or **56K** if possible.
- In the dialing directory, all entries can be set to the highest rate the software supports. The modem will auto-negotiate the highest speed connection between itself and the other modem.
- In the section of your software that may be called "Terminal Settings," make sure that **Hardware Flow Control (RTS/CTS)** is **ON** (or **Yes**). This is necessary for V.42bis file transfers to work.
- Set **auto baud detect to OFF** (or **NO**).
- Some programs ask **Send init if CD high?**, which should be set to **YES**. Otherwise the modem may not receive the proper initialization string.
- If your software suggests an initialization string for this modem, you should use it. If this modem is not listed by your software and no initialization string is suggested, use the following initialization string for IBM PCs and compatibles: **AT &F &C1 &D2**.

Note:	If you are familiar with AT commands and you save any settings in the modem's nonvolatile memory using the modem's **&W0** or **&W1** command, remove the **&F** from the initialization string. Otherwise, the contents of the initialization string will override the saved settings.

- If the software does not provide a dial string, use **ATDT** for tone dialing.
- If your telephone service includes Call Waiting that you can temporarily suspend by dialing a special code, include that code in the dial prefix option, followed by a comma, in the software. If your software does not have a dial prefix option, you need to insert the code for each phone number in the dialing directory. If you need to dial a special code number, such as **9**, to get an out-

side line, put the number (followed by a comma) before the phone number.

- When you use your software and modem, you will rarely, if ever, need to send AT commands directly to the modem. If you do want to enter AT commands, however, you must do so from the software's terminal mode.

To use AT commands in terminal mode

1. Start your data communications program.
2. Change to terminal mode (also called command, local, direct, or dumb mode).
3. Type the AT command you need and press the **Enter** key.

When you finish, you can return to the data communications program's standard user interface. See the software's documentation if you need help.

The modem is in data mode when it is communicating online with another modem, such as a modem at your workplace or home. While in data mode, the modem will not respond to AT commands. To communicate with your modem without disconnecting the call, use active options in the software's user interface or the **+++** escape sequence. Communicating directly with your modem during a call is seldom necessary.

Returning to the Factory Settings

Tip: Many programs for IBM PC-compatible computers require that the modem initialize (or start up) with command settings **&C1** and **&D2**, the factory default settings, in the initialization string.

To return to the modem's factory default settings:

- In terminal mode, type **AT &F** and press the **Enter** key.

To return to the basic settings expected by many data communications programs for IBM PC compatibles

- In terminal mode, type **AT &F** and press the **Enter** key.

Hot Swapping the PC Card

Your PC Card modem hardware supports hot swapping (or "hot plugging"). This means that after installing the modem you can remove and re-insert it as needed without powering down or restarting (rebooting) your computer. If you are using Windows 95/98/Me/2000 with PC Card 2.*x*-compliant card management software, hot swapping is supported automatically.

Remember: PC Cards are not hot-swappable when running Windows NT.

Note:	For reliable communications, you should insert the modem card before you start up your data communications or fax software. Otherwise the modem will not receive the initialization string from the software. You should remove the modem only after you exit the software or the modem may not receive important call termination information.

Conserving Power

To conserve power when the modem is running on the computer's battery, the PC Card defaults to sleep mode when not in use. When the modem is in sleep mode, it "wakes up" as soon as it senses activity such as a modem command or an incoming call.

To Disable the PC Card's Sleep Mode:

Change your communication software's initialization string to include **S24=0**. For example, if the current initialization string is **AT&C1&D2**, change it to **AT&C1&D2S24=0**.

If you want to disable your PC Card's sleep mode "permanently," run your Windows HyperTerminal program. Give the command **ATS24=0&W&Y (Enter)**. This command will last until you change the **S24** setting from 0 using HyperTerminal.

Note:	You can set **S24** to any value between and including 1 and 255 seconds (0 = off.)

Disabling the Computer's Sleep Mode When Using Auto-Answer

Many notebook computers also have a sleep mode. It is usually implemented by software that automatically shifts the computer to a reduced operating speed when the processor has been idle for more than a specified period of time. If you want the modem to answer incoming data or fax calls when you are away from the computer, you may need to disable the computer's sleep mode. See **Appendix A: Disabling Power Management in Windows**. You should also enable the auto-answer function in the fax or data communications software.

Traveling with Your Modem

When you pack your computer for travel, you can leave the modem in the PC Card slot and simply disconnect and pack the phone cable. The modem does not draw power from the computer battery when the computer is off.

If you travel to another country and want to change your country setting, refer to page 10 of this manual for instructions.

Important Information about V.92 Modems

With V.92, as with the earlier V.90 standard, your connection speed depends on your phone line and your Internet Service Provider (ISP). To enhance compatibility, this modem automatically detects whether to use V.92, V.90, or a slower mode when it connects to your ISP.

Your V.92 modem includes the following capabilities.

QuickConnect:
A V.92 modem remembers the line conditions of the last number called, and uses this information to try to reduce connection times.

Modem-on-Hold:
You have the option of receiving voice calls while online. You can answer the call and put your Internet session on hold if your ISP supports this capability and you have Call Waiting service compatible with the modem.

- **Faster Upload Speeds:**
  Upload speeds may be increased, from 33.6K bps to a maximum of 48K bps. (Actual rates vary, depending on line conditions.)
- **V.44 Data Compression:**
  The V.44 standard lets you browse the Web and transfer data at higher speeds.

To make the most of your V.92 modem, follow these steps:

1. Contact your ISP and get the phone number of a V.92 connection to the ISP.
2. Check our web site for news of any V.92 updates. If an update is available, follow the directions below for upgrading your modem.

Troubleshooting

If your modem stops working, please read this section carefully before calling Customer Support. In addition, your modem CD includes a list of Frequently Asked Questions (FAQs).

Important—If Your Computer Has an Existing Modem

You must redirect your application software so that it recognizes your new modem. To do so, follow these instructions:

- **Dial-up Networking Users:**
  From your computer's desktop, double-click the **My Computer** icon and then the **Dial-up Networking** icon. Double-click the **Make New Connection** icon, select your new V.92 modem from the dropdown list, and follow the prompts.

- **America Online Users:**
  From within AOL, click the **Setup** button; then click the **Expert Setup** button. Select the **Devices** tab and double-click the new V.92 modem you've installed. Click **OK** and then **Close**.

Plug and Play Setup Problems with Windows

Under some circumstances, the Plug and Play setup under Windows 95/98/Me/2000 may not resolve all installation problems. The Windows Help system has an excellent tool for thoroughly diagnosing and solving many problems.

1. On your desktop, double-click the **My Computer** icon.
2. Choose the **Help Topics** command in the **Help** menu. Windows displays the **Windows Help** dialog box.
3. Select the **Contents** tab. Note: Windows Me and 2000 include a Help Search option, which you can use instead; search for "hardware conflict," for example.

4. Click **Troubleshooters**. (For Windows 98, you will also have to click **Windows 98 Troubleshooters**.) Then click the hardware conflict help entry.
5. Follow the instructions for determining and resolving a hardware conflict.

This should solve your problem. Remember to write down your COM port setting. Return to page 9 to complete the installation.

If you still have problems, it probably means that although you are running a version of Windows that supports Plug and Play, you may have an older computer that is not completely compatible with this feature. Try the steps in the next section.

Freeing up Resources in BIOS under Windows 95/98/Me/2000

This procedure is a little more difficult than the previous one, but with the help of your computer's documentation you should be able to clear up any remaining problems.

1. Close all running programs. Shut down your computer and restart it: Click **Start** and then **Shut Down**. Shut down your computer completely. Turn the power off, wait about 5 seconds, and turn the power back on.
2. As your computer goes through the startup process, it should display a key or key combination that you can use to enter the **BIOS Setup** program. Enter the BIOS Setup program and disable COM2. Consult your computer's documentation if the procedure is not clear based on the on-screen prompts.
3. Write down and save the new COM port setting and exit **Setup**.
4. The BIOS automatically reboots your computer.
5. Choose **Control Panel** from the **Settings** command in the **Start** menu.
6. Double-click the **System** icon.
7. Click the **Device Manager** tab.
   Find the **Ports** (COM & LPT) device and click the **+** sign. This expands the device list under **Ports**.

8. Select **Communications Port** (COM2). Click the **Remove** button in the **Device Manager** window. This removes the device currently assigned to COM2.
9. When Windows displays the **Confirm Device Removal** warning, click **OK**.
10. Double-click **Modem** in the **Device Manager** window.
11. Double-click the Modem icon for your model.
12. Click the **Resources** tab.
13. Uncheck the **Use automatic settings** checkbox.
14. Scroll through the Basic configuration options until you find the one that displays the **Input/Output Range 02F8 - 02FF**. This is COM2. The **Conflicting device** list box should say **No conflicts**. If there are conflicts, call Tech Support.
15. If there are no conflicts, close the **Modem Properties** window, **System Properties** window, and **Control Panel** window by clicking **OK** for each.
16. Shut down your computer, turn off the power, and restart it. **Going through this power cycle can be important.** Merely restarting Windows may not allow the BIOS to register the changes properly.

If Windows finds your other serial port, it may try to assign the port to COM2, but won't be able to because your modem is already using that system resource.

Other Troubleshooting Tips

IMPORTANT:
If you need to reformat your hard drive or to reinstall Windows 95/98/Me/2000, **you must physically remove your modem before doing so.**
Install the drivers and then the modem as a new install, following the instructions in this manual.

Problem: **The software cannot find the modem and the modem does not respond to AT commands. (The following comment applies to many other problems as well.)**

Solution: The most common error with modems is that the communications software is not configured for the same COM port as the modem. Check which COM port the modem is using. Make sure that the software's COM port setting matches the modem's COM port setting.

Another problem is that COM port resources may be in use by another device. Make sure that the COM port resources used by the modem are not being used by any other device, such as a soundcard.

Problem: **You type an AT command line in a terminal application and press Enter, but your modem fails to execute the command line. Or there was no response after executing a command.**

Solution: Be sure you type **AT** at the beginning of the command line.

Make sure the communications software is configured for the same COM port as your modem.

Be sure your modem is not in data mode when you type the command. Use the escape character sequence to switch to terminal mode (The default escape sequence is to wait at least one second, type **+++**, and wait another second or more.)

If you typed a command but did not receive an **OK** response from your modem, the **E0** and **Q1** commands may be in effect, disabling echo and responses. Verify this with the **&V** command. To enable echo and responses, type **ATE1Q0** and press **Enter**.

Problem: The modem speaker volume is too low or too high.

Solution: Your modem has a small speaker on board that gives you audible feedback of dial tones and remote connection signals ("handshaking"). This is not the same as the speaker that you may have connected to your sound card.

If the software allows you to control the volume, make sure the speaker is enabled and set to a comfortable volume.

If the software does not have speaker settings, add one of the **AT** commands listed below to the initialization string:

L1 for low volume
L2 for medium volume
L3 for highest volume
M0 to turn the speaker off entirely

For example, if you want the volume low and the software uses the initialization string
AT &F, change it to **AT &F L1**.

Problem: The modem does not automatically dial a call when you send a Dial command.

Solution: Make sure the modem speaker is turned on in your software so that you can hear dialing sounds. Also, make sure that the phone line is plugged in.

Make sure that you are dialing a valid phone number, including any required dial prefixes.

If you are using tone dialing on a line that requires pulse dialing, the line may not be able to accept tone-dialed

calls. Select Pulse dialing in your software, or make sure software dialing prefix is **ATDP** (for pulse dialing).

Make sure your communications software and modem are configured for the same COM port.

Make sure your modem has hung up from the previous call. Select **Hang Up** in your software; or type **ATH** in terminal mode.

Problem: **The modem can connect to some modems, but not to others.**

Solution: A remote modem does not respond because of the extended negotiation process by which modems determine the best common connection between them. If this is the case, you may have to disable part or all of the negotiation process. In the following table, “protocol” means error correction and data compression.

To force different communication speeds	Type these AT commands and press Enter
Negotiate speed and protocol (default setting)	**AT &F**
To force protocol	**AT \N3**
Dualmode (V.90 or V.92)—56000 bps	**AT+MS=V92,1**
V92 only (disable V.90)—56000 bps	**AT+MS=V92,0**
V.90 only (disable V.92)—56000 bps	**AT+MS=V90,0**
Disable both 56K and autorate on V.34—33600 bps	**AT+MS=V34,1**
V.34—33600 bps	**AT+MS=V34,0**
V.32bis—14400 bps	**AT+MS=V32B,0**
V.32—9600 bps	**AT+MS=V32,0**
2400 bps	**AT+MS=V22B,0**
1200 bps	**AT+MS=V22,0**

Notes: Some software allows these commands to be added to the list of dial prefixes or the initialization string.

When the protocol is forced, the modem will not attempt to connect at other protocols if it cannot connect at the forced protocol. It will try to connect at the fastest speed available within the forced protocol.

There are other configurations that can be forced as well. If you need to select a particular configuration, use the AT command strings shown below. You can always return to the modem's default configuration by typing **AT &F** and pressing the **Enter** key.

Remember that if you do this, the modem will not have received the commands in your software's initialization string as it normally would. Using the **ATZ** command overcomes this problem if you have saved all of your setup parameters in nonvolatile memory. (To save setup

parameters in nonvolatile memory in **AT** terminal mode: Type **AT**, followed by the parameter settings you desire, followed by **&W**, and press **Enter**. For example, if you type **AT &C1 &D2 &W** and press **Enter**, the **&C1** and **&D2** parameter settings are stored.)

To force	Type command & hit Enter
MNP 5/MNP 4 operation	**AT \N5**
LAPM only (V.42)	**AT \N4**
MNP 4 only	**AT \N5%C0**
V.42bis data compression	**AT+DCS=1,0**
V.44 data compression only	**AT+DCS=0,1**
Auto-answer	**AT S0=1**

Problem: Your V.92 modem does not connect reliably at V.92.

Solution: First be sure that you have the latest modem firmware downloaded from our Web site, as discussed on page 18. Also make sure that your ISP offers V.92 at the number you are calling.

If you still have a V.92 problem, you may want to modify your Internet Connection string in Windows 95/98/Me/2000: Double-click the **My Computer** icon on your Desktop, and then double-click **Dial-up Networking**. Right-click the existing Internet Connection that you wish to modify and select **Properties**. Click **General | Configure | Connection | Advanced**.

You can add initialization (init) strings on the line labeled **Extra Settings**. Enter *one* of the init strings listed below. Try these commands one at a time until you find the one that gives you the highest possible connection rate for your telephone line conditions.

Init String	Definition	
ATW2S7=150+MS=V90 **OR** AT&F+MS=V92	S7	Sets wait time for remote carrier, wait time can be 1-255 seconds
AT&FS7=150	&F	Sets factory defaults
AT&F&C1&D2\N5\A2=1S7=100	&C1	DCD (Data Carrier Detect) follows the remote carrier signal
	&D2	DTR (Data Terminal Ready) reacts with a disconnect, sends "OK" response and disables auto-answer while DTR signal is OFF
	\N5	MNP Error Correction Only
	\A2	Maximum block size: 192 characters

Problem: Your modem disconnects while communicating with a remote system.

Solution: The remote system has hung up, and you need to reconnect. The other most common sources of interruptions are Call Waiting or someone picking up an extension phone.

If you have Call Waiting, you can usually temporarily disable it by including ***70,** (including the comma), or by selecting it as a prefix, in the software's dialing directory.

Depending on your service, you may not be able to disable Call Waiting for incoming calls. If your incoming data calls are frequently disrupted by Call Waiting, you should consider dropping the service or installing a separate phone line without Call Waiting.

Problem: **Your modem does not make a connection.**

Solution: If your modem places calls but never connects, make sure you are dialing the right number and that the remote modem is turned on.

Problem: **You receive bursts of errors occasionally, but otherwise data quality is good.**

Solution: The connection may have been established on poor-quality or noisy telephone lines. Hang up and place the call again to try to obtain a better connection.

Someone may be picking up an extension connected to the line that your modem is using. If your modem is sharing a telephone line with other telephones, inform the other users when you will be making a data call, or install a separate line dedicated to data calls.

Your telephone line may have a Call Waiting feature and a call is being received. See the Call Waiting discussion above.

Problem: **Random errors occur or data is missing in transmitted data.**

Solution: Use the MNP or V.42 protocol if the remote modem supports one of these protocols. See the tables in this Troubleshooting section for more information.

Select a lower baud rate in your communications software and place the call again.

If both modems are using the MNP or V.42 protocol, the only way this can occur is if your modem and communications software are not using the appropriate flow control. Configure your communications software for **RTS/CTS** (hardware) flow control. Your computer will now pause for the transmission to be stored.

Problem: **Modem performance seems sluggish.**

Solution: If you are connected to the Internet, there may be a lot of "traffic" at the Web sites you are visiting. Other possible causes are lack of sufficient memory in your computer (16 megabytes of RAM required) or a slow processor (you need a Pentium® 133 or faster, or equivalent).

Problem: **Data appears garbled on the screen.**

Solution: Your communications software character set-up (start bit, data bits, stop bits, and parity bit) does not match that of the remote system. Check your settings against those used by the remote system and make sure they match. Pay particular attention to the parity setting, as this is the most common difference among systems. You should normally use 8 data bits, NO parity, and 1 stop bit (**8, NONE, 1** or **8N1**). Another common setting is 7 data bits, EVEN parity, and 1 stop bit (**7, EVEN, 1** or **7E1**).

Problem: **You encounter communications problems with your modem.**

Solution: Check that your communications software has been set up properly. Recheck the initialization string and dial string specified in your software manual.

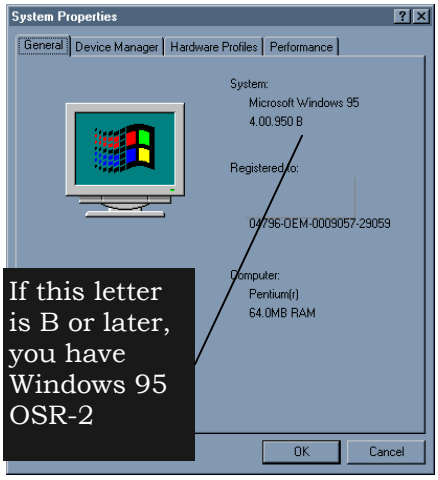
Memory-resident programs can cause a variety of problems. Try starting up your computer without them. Programs that can cause problems include antivirus programs and screen savers.

Appendix A: Disabling Power Management in Windows

Most laptop computers have power management capabilities to enhance battery life. Windows 95 version OSR-2 or later includes an option to automatically power down your PC Card modem when the computer has been idle for a time. All versions of Windows 98 include a power management feature. Enabling this power-saving feature, however, can cause problems with some software. We advise that you turn off this feature before using your PC Card.

If you are running Windows 95 and need to determine which version you have, follow these steps:

1 From the Windows 95 desktop, click **Start |Settings | Control Panel**. When the Control Panel displays, double-click on **System**.

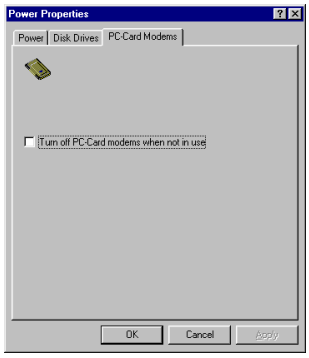


2 If the model number ends in **B** or a later letter of the alphabet, you have Windows 95 OSR-2 and should continue with these instructions.

Follow these steps to disable your PC Card's power management feature:

1. From your desktop click **Start** | **Settings** | **Control Panel**. When the Control Panel displays, double-click **Power**.

2. When the **Power Properties** dialog box displays, click the tab labeled **PC-Card Modems**. If the checkbox labeled **Turn off PC-Card modems when not in use** is checked, click on it to uncheck it. Then click **OK**.



Your computer's power management capability should now be compatible with your communications software.

If you are very concerned about the power drain from your PC Card, you can check the **Turn off PC-Card modems when not in use** box when you know you won't be using the modem. Or you can take the modem out of the computer's PC-Card slot when the modem is not in use.

Appendix B: Regulatory Information

FCC Part 68 Telecommunications Statement

This equipment complies with Part 68 of the FCC rules. The unit bears a label which contains the FCC registration number and Ringer Equivalence Number (REN). If requested, this information must be provided to the telephone company.

This equipment uses the following standard jack types for network connection: RJ11C

This equipment contains an FCC compliant modular jack. It is designed to be connected to the telephone network or premises wiring using compatible modular plugs and cabling which comply with the requirements of FCC Part 68 rules.

The Ringer Equivalence Number, or REN, is used to determine the number of devices which may be connected to the telephone line. An excessive REN may cause the equipment to not ring in response to an incoming call. In most areas, the sum of the RENs of all equipment on a line should not exceed five (5.0).

In the unlikely event that this equipment causes harm to the telephone network, the telephone company can temporarily disconnect your service. The telephone company will try to warn you in advance of any such disconnection, but if advance notice isn't practical, it may disconnect the service first and notify you as soon as possible afterwards. In the event such a disconnection is deemed necessary, you will be advised of your right to file a complaint with the FCC.

From time to time, the telephone company may make changes in its facilities, equipment, or operations which could affect the operation of this equipment. If this occurs, the telephone company is required to provide you with advance notice so you can make the modifications necessary to obtain uninterrupted service.

There are no user-serviceable components within this equipment.

It shall be unlawful for any person within the United States to use a computer or other electronic device to send any message via a telephone facsimile unless such message clearly contains, in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business, other entity, or

individual sending the message and the telephone number of the sending machine or of such business, other entity, or individual. The telephone number provided may not be a 900 number or any other number for which charges exceed local or long distance transmission charges. Telephone facsimile machines manufactured on and after December 20, 1992, must clearly mark such identifying information on each transmitted message. Facsimile modem boards manufactured on and after December 13, 1995, must comply with the requirements of this section.

This equipment cannot be used on public coin phone service provided by the telephone company. Connection to Party Line Service is subject to state tariffs. Contact your state public utility commission, public service commission, or corporation commission for more information.

FCC Part 15 Emissions Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Industry Canada Emissions Statement

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Industry Canada CS03 Statement

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing the equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of concern. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas. **Caution**: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Notice: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed 5.

Additional Test Information

This equipment has been tested to the requirements of TBR 21: January 1998 revision.

CE

Austria	Belgium	Denmark	Finland
France*	Germany	Greece	Ireland
Italy	Luxembourg	Netherlands	Portugal
Spain	Sweden	UK	

Note: *EU member states with restrictive use for this device are indicated by an asterisk (*) in the table above. This device is also authorized for use in all EFTA member states (**Switzerland, Iceland, Liechtenstein, Norway**).*

Declaration of Conformity

The manufacturer declares under sole responsibility that this equipment is compliant to Directive 1999/5/EC (R&TTE Directive) via the following:

Directives	**Standards**	**Test Reports Issued**
73/23/EEC-Low Voltage	EN 60950	electrical safety
89/336/EEC-EMC	EN 50082-1	EMC – immunity
89/336/EEC-EMC	EN 55022	EMC – emissions

The product is CE marked.

Electrostatic Discharge (ESD) Statement

This unit may require resetting after a severe ESD event.

Customer Service Table

If you are experiencing a problem with your modem, try resolving it with the troubleshooting suggestions in this Guide. If you need to call Technical Support or Customer Service, you will need the information below. We recommend that you fill out this table now for future reference.

Modem Part Number *(located on the barcode on the box)*	_____
Serial Number *(located on the bottom of the case beneath the barcode)*	_____
COM Port	_____
Date of Purchase	_____
Store or Dealer	_____

Note: Before returning any product, please call for a Return Authorization Number (RA#).

Also, remember the following before calling:

- Use a phone located near the computer to which your modem is attached.
- Identify which Hayes modem you have and the communications software you are using.
- Identify your computer or its operating system.
- Write down all factors specific to your problem.